

Marginal Revenue for an Imperfect Competitor

Marginal Revenue Pulls Average Revenue Toward It

Marginal revenue and price are not the same thing, but price and average revenue are the same concept with most applications of demand. With some control over price and output, imperfectly competitive firms realize that the additional revenue garnered from selling extra output changes at a different rate than the price of the good. Average revenue, defined as total revenue / output, falls as the price-searching firm increases output. Marginal revenue, defined as $\Delta \text{total revenue} / \Delta \text{output}$, falls even faster than average revenue as output increases.

Assuming the monopoly firm charges every buyer the same price, marginal revenue falls approximately twice as fast as price when the business offers additional units into the product market.

Look at the market-demand schedule in Figure 32.1. Buyer interest begins at a price of \$13.50 when no units are demanded. With a \$1.50 drop in price to \$12.00, 100 units are demanded. Total revenue is \$1,200 at the \$12.00 price per unit; marginal revenue matches price on the first sales block of 100 units. When price falls to \$10.50 per unit, no person pays a price below \$10.50, yet marginal revenue is \$9.00. What causes this result?

This monopoly firm, knowing that the market demand schedule is also the firm's demand schedule, recognizes that selling more units of product requires the same price for all buyers. It gives up the original price of \$12.00 per unit and adopts \$10.50. Total sales are 200 at a price of \$10.50 per unit, yet the firm had to lower the price \$1.50 on the first block of 100 units to generate the additional block of 100 units.

Thinking on the margin, the monopolist recognizes that lower prices for the first sales block caused the surrender of \$150 in revenue on the first 100 demanded to gain the next sales block of 100 units. So the \$1,050 gain in revenue from the last 100 sales requires a \$150 deduction in revenue from the first sales block of 100 units. The last sales block, of an additional 100 units, brings \$900 net revenue, all blocks considered.

Now it is time to fill in the missing data and then plot the data as a graph on Figure 32.2.

Adapted from Phillip Saunders, *Introduction to Microeconomics: Student Workbook*, 18th ed. (Bloomington, Ind., 1998). Copyright © 1998 Phillip Saunders. All rights reserved.

Fill in the blanks on the table, and plot both the demand curve and the marginal revenue curve on Figure 32.2. Label the demand curve D and the marginal revenue curve MR. (Note: Plot the marginal revenue data midway between the quantity levels shown in the second column of the table.) Then answer the following two questions.

1. Notice that the price points show \$1.50 changes. By how much does marginal revenue change for each change in price points? _____
2. For a firm large enough to see the whole demand curve, marginal revenue is positive when the demand curve is price elastic. Marginal revenue becomes negative when the segment of the demand curve becomes price inelastic. Will a single-price monopoly ever operate on the inelastic portion of its demand curve? Why or why not?

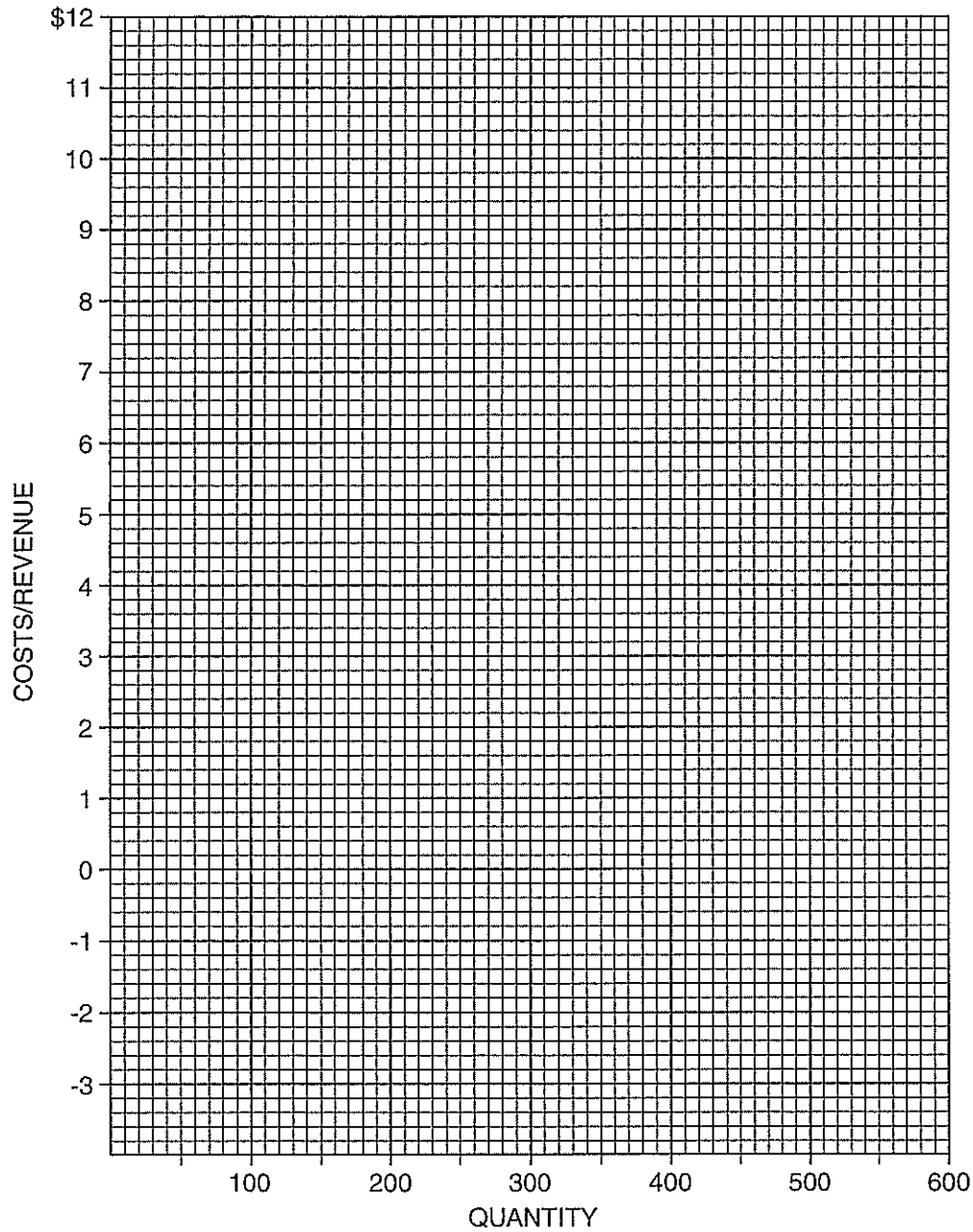


Figure 32.1
Average Revenue and Marginal Revenue for a Monopoly

Price (Average Revenue)	Quantity Demanded (Q)	Total Revenue (R)	Change in Total Revenue (ΔR)	Marginal Revenue (ΔR / ΔQ)
\$13.50	0	\$0		
12.00	100	1,200	\$1,200	\$12.00
10.50	200	2,100	900	9.00
9.00	300	2,700		
7.50	400			
6.00	500	3,000	0	0
4.50	600	2,700	-300	-3.00



Figure 32.2
Plotting Average Revenue and
Marginal Revenue for a Monopoly



Pure Monopoly

Like other producers in a market economy, a pure monopolist tries to maximize profit by producing at an output where marginal cost (MC) equals marginal revenue (MR). For a firm in a competitive market, price and marginal revenue are the same; but for a monopolist, who “sees” the entire market demand curve and who must charge all buyers the same price, marginal revenue is below price. This activity considers the monopolist’s choice of output level.

Part A

1. Figure 33.1 presents a summary of the relevant cost and revenue data facing a pure monopoly firm. Fill in the blanks on the table.
2. Plot the data for MC, MR, ATC (average total cost) and AR (average revenue) on Figure 33.2. (Note: For this problem plot MC and MR on the number.)



Figure 33.1

Pure Monopoly: Cost and Revenue Data

Quantity of Output	Total Cost	Marginal Cost	Average Total Cost	Total Revenue	Marginal Revenue	Average Revenue (Price)
0	\$0	—	\$0	\$0	—	\$0
1	900	\$900	900	1,200	\$1,200	1,200
2	1,600	700	800	2,100	900	1,050
3	2,100		700	2,700		900
4	2,400			3,000	300	
5	3,000	600		3,000		
6	4,200	1,200		2,700	−300	

Part B

After you have completed the table and the graph, answer these questions by filling in the blanks and shading in the area indicated in Question 7. In this problem, plot the MC and MR data at each quantity rather than at the midpoint. This is just for simplicity and does not change the fundamental analysis.

3. A profit-maximizing monopolist would produce an output of _____ units.
4. At this level of output, MC is _____ per unit and MR is _____ per unit.
5. At this level of output, ATC is _____ per unit, and AR (price) is _____ per unit.

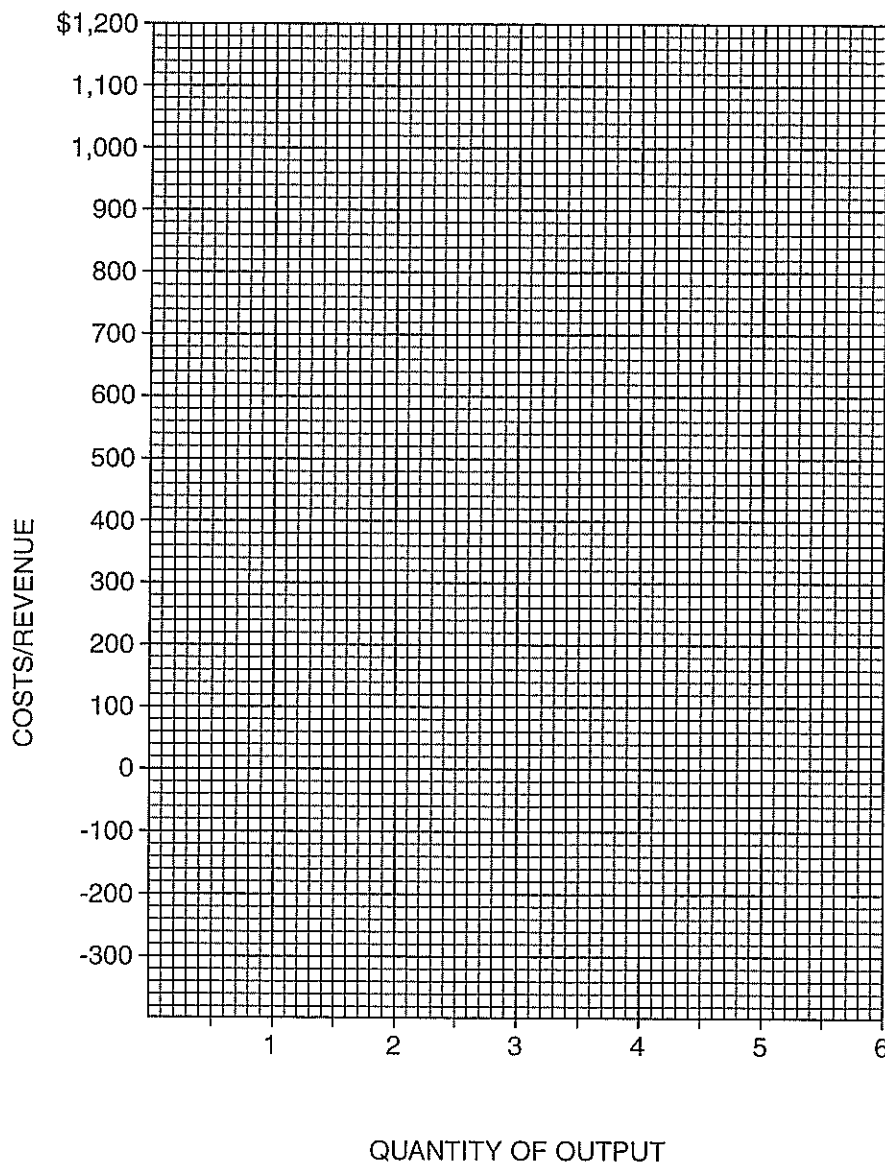
Adapted from Phillip Saunders, *Introduction to Microeconomics: Student Workbook*, 18th ed. (Bloomington, Ind., 1998). Copyright © 1998 Phillip Saunders. All rights reserved.

6. This gives the monopolist an economic profit of _____ per unit for a total economic profit of _____.
7. Shade in the area on the graph that represents the total economic profit figure indicated in your answer to Question 6.



Figure 33.2

Profit-Maximizing Equilibrium for a Monopoly



Monopoly Pricing

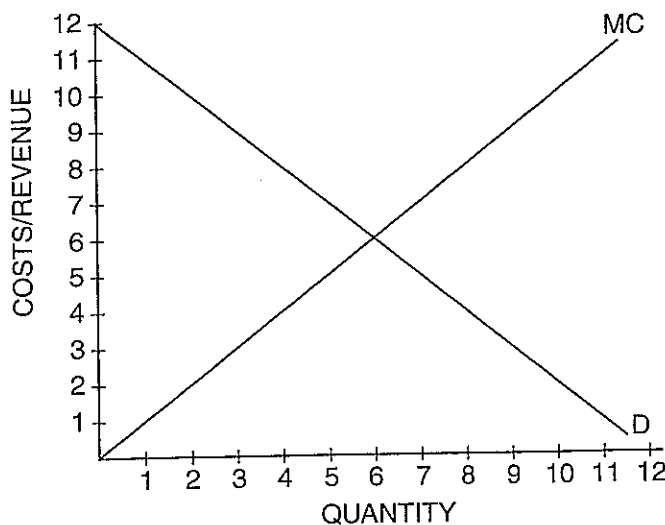
Part A

Equilibrium for the Perfectly Competitive Industry

Consider Figure 34.1. Assume that the market described by the figure is perfectly competitive, and MC represents the horizontal summation of marginal cost curves and, therefore, the market supply curve. Use Figure 34.1 to answer the following questions.



Figure 34.1
Perfect Competition



1. What quantity of output will be produced? _____
2. What price will the market establish? _____
3. Calculate the amount of the consumer surplus. Darkly shade the area of consumer surplus.
4. Calculate the amount of the producer surplus. Lightly shade the area of producer surplus.

Activity written by Robert Graham, Hanover College, Hanover, Ind.

Part B

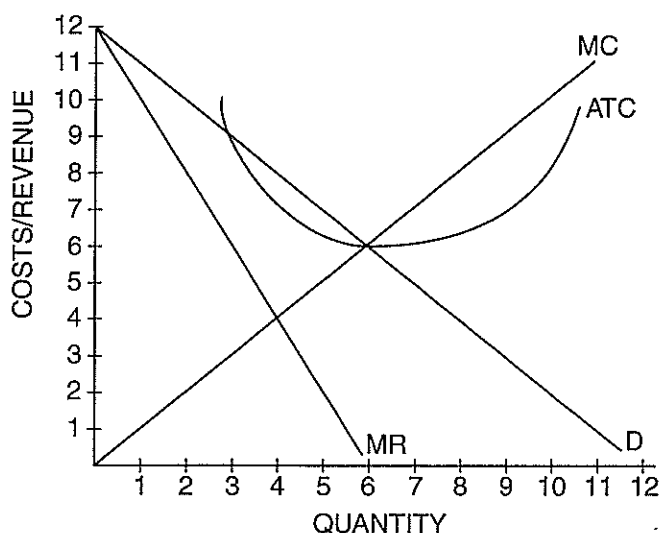
Equilibrium for the Monopolist

Now consider the same demand and cost curves, but assume the market is a monopoly. Therefore, MR represents the monopolist's marginal revenue curve and MC represents the monopolist's marginal cost curve. Using Figure 34.2, answer the following questions.



Figure 34.2

Monopoly



5. What quantity of output will be produced? _____ Why?
6. What price will the monopolist establish? _____ Why?
7. Calculate the amount of the consumer surplus. Darkly shade the area of consumer surplus.
8. Calculate the amount of the producer surplus. Lightly shade the area of producer surplus.

9. How does the price and output of a monopolist differ from that of the perfectly competitive industry?
10. What portion of the consumer surplus in the competitive situation was transferred to the firm in the monopoly situation?
11. How does a monopoly affect consumer surplus? Is this good or bad?

Let's Play Monopoly

Read the article and answer the questions that follow.

Let's Play Monopoly

By Robert J. Barro

It's almost the end of summer and time for the first annual contest to choose the best operating monopoly in America. The contestants, selected by a panel of Harvard economists, are as follows:

1. The U.S. Postal Service
2. OPEC
3. Almost any cable-TV company
4. The Ivy League universities (for administering financial aid to students)
5. The NCAA (for administering payments to student-athletes)

Some other worthy candidates, which just missed the cut, are the National Football League, the American Medical Association and the U.S. Departments of Agriculture and Defense.

Each contestant exhibits fine monopolistic characteristics and is worthy of serious consideration for the award. The U.S. Postal Service claims to be the longest-running monopoly in America and has the distinction of having its control over first-class mail prescribed (perhaps) by the Constitution. The monopoly has preserved large flows of revenues and high wage rates despite studies showing that private companies could carry the mail more efficiently at much lower cost.

On the other hand, the position of the Postal Service has been eroded: first, by successful competition on package delivery; second, by the recent entry of express-delivery services and third, and potentially most damaging, by the introduction of the fax machine. Since faxes are bound to supplant a substantial fraction of first-class letters, the failure to get Congress to classify a fax as first-class mail and, hence, the exclusive domain of the Post Office shows a remarkable loss of political muscle. Thus, despite past glories, it is hard to be sanguine about the long-term prospects of the Post Office as a flourishing monopoly.

Good Guys and Bad Guys

OPEC was impressive in generating billions of dollars for its members from 1973 to the early 1980s. To understand the functioning of this cartel, it is important to sort out the good guys from the bad guys. The good guys, like Saudi Arabia and Kuwait, are the ones who have typically held oil production below capacity and thereby kept prices above the competitive level. The bad guys, like Libya and Iraq (when Iraq was allowed to produce oil), are the ones who have produced as much as they could and thereby kept prices low.

The good guys were responsible for the vast expansion of oil revenues during the blissful period after 1973. (Hence, they were responsible for the considerable difficulties endured by oil consumers.)

Activity written by Joanne Beaver, Cumberland Valley High School, Mechanicsburg, Pa.; Janice H. Dukes, Opelika High School, Opelika, Ala.; and Gloria Washington, Dillard High School, Ft. Lauderdale, Fla.

But, unfortunately, these countries could not keep the other OPEC members in line and were also unable to exclude new producers or prevent conservation by consumers. Thus, oil prices plummeted in 1986 and only the start of the Persian Gulf crisis . . . [in 1991] could get prices temporarily back to a respectable level.

In any event, it is unclear that OPEC qualifies for the contest: It is not really American, and its members would probably be arrested for price-fixing if they ever held an official meeting in America.

Most cable-TV companies have government-issued licenses that keep competitors out. Thus, this business supports the hypothesis (offered, I think, by George Stigler) that private monopolies are not sustainable for long unless they have the weight of government behind them.

Fear About the Future

The rapid escalation of prices and the limitations on services seem, however, to be getting customers and their congressional representatives progressively more annoyed. Thus, it would not be surprising if legislative action leads soon to a deterioration of the cable companies' monopoly power. It may even happen that consumers will be able to choose among cable companies in the same way that they choose currently among long-distance telephone carriers; how could the struggling providers maintain a respectable cartel in that environment? This fear about the future diminishes the claim of this otherwise worthy contestant for the first annual prize.

Officials of Ivy League universities have been able to meet in semipublic forums to set rules that determine prices of admission (tuition less financial aid) as a function of applicant characteristics, especially financial resources. In some cases, the schools pooled information to agree in advance on the right price to charge a specific customer. Airlines and other industries that wish to price discriminate can only dream about this kind of setup.

Moreover, the universities have more or less successfully applied a high moral tone to the process: Rich applicants — especially smart rich applicants — are charged more than the competitive price for schooling in order to subsidize the smart poor, but it is unclear why this subsidy should come from the smart rich rather than from taxpayers in general.

In any event, the universities' enviable cartel position has been damaged by the unenlightened Justice Department, which argued that the price-setting meetings were a violation of antitrust laws. Since most of the universities involved have agreed to stop these practices, it may be that future prices for private higher education will come closer to being competitively determined. It seems that this prospect has already motivated some distinguished universities to declare themselves as being in financial difficulty.

Remarkably Successful

The final contestant, the NCAA, has been remarkably successful in holding down "salaries" paid to college athletes. It would be one thing merely to collude to determine price ceilings (for example, to restrict payments so that they not exceed tuition plus room and board and some minor additional amounts), but the NCAA has also managed to monopolize all the moral arguments.

Consider a poor ghetto resident who can play basketball well, but not well enough to make it to the NBA. If there were no NCAA, this player might be able legitimately to accumulate a significant amount of cash during a four-year career. But the NCAA ensures that the player will remain poor after four years and, moreover, has convinced most observers that it would be morally wrong for the college to pay the player a competitively determined wage for his or her services.

For many economists, this interference with competition — in a setting that has no obvious reasons for market failure — is itself morally repugnant. But the outrage is compounded here because the transfer is clearly from poor ghetto residents to rich colleges. Compare the situation of contestant number 4, the Ivy League universities, in which the transfer from rich to poor students can readily be supported on Robin Hood grounds.

The NCAA has the much more difficult task of defending a policy that prevents many poor individuals from earning money. Incredibly, this defense has been so successful that it has even allowed the organization to maintain the moral high ground. When the NCAA maintains its cartel by punishing schools that violate the rules (by paying *too* much), almost no one doubts that the evil entities are the schools or people who paid the athletes, rather than the cartel enforcers who prevented the athletes from getting paid. Given this extraordinary balancing act, the decision of the panelists was straightforward, and the NCAA is the clear and deserving winner of the first annual prize for best monopoly in America.

The panel of economists also considered briefly an award for the least-efficient monopoly in America. This choice was, however, too easy. It goes to the American Economic Association, which has been a dismal failure at establishing licensing requirements or other restrictions on entry into the economics profession. It is a sad state of affairs when almost anyone can assume the title of economist.

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Let's Play Monopoly

1. Do you agree or disagree with the final contestants for the monopoly award? Explain.
2. How might e-mail change the market for first-class mail?
3. What prevents a cartel, particularly OPEC, from maintaining a long-run monopoly? What would help to make it more successful?
4. What are the standard arguments against monopolies? What example is provided in the reading that emphasizes these arguments?
5. What is price discrimination and under what conditions is it successful?

6. Why doesn't the NCAA have competition in providing a forum for young athletes to play sports?
7. How does leaving college early to go pro or going pro directly from high school affect the NCAA monopoly?
8. Why are monopolies considered to be bad? Be sure to discuss price, output and efficiency in your answer.

Price Discrimination

When producers have market power and they sell a good that cannot be resold, the possibility for price discrimination arises. Price discrimination occurs when a producer is able to charge consumers with different tastes and preferences different prices for the same good.

We know profit maximization for a firm that is able to set a single price occurs when the firm produces the quantity at which $MR = MC$. If a producer is able to price discriminate, however, then profits can be even higher.

Part A

Pricing with Market Power and Consumer Surplus

Pat's Patriotic Tattoos is the only tattoo parlor in town. Pat tattoos only images of the American flag. There are 20 consumers who are willing to buy a tattoo. Each consumer is interested in buying only one tattoo, but they vary in their willingness to pay. One consumer is willing to pay \$20 for a tattoo; another is willing to pay \$19; a third, \$18, down to the consumer least willing to pay who has a reservation price of \$1.

1. The demand schedule is given below in Figure 36.1. Complete the table.



Figure 36.1

Demand Schedule

Price	Quantity	Total Revenue	Marginal Revenue
\$20	1		—
19	2		
18	3		
17	4		
16	5		
15	6		
14	7		
13	8		
12	9		
11	10		
10	11		
9	12		
8	13		
7	14		
6	15		
5	16		
4	17		
3	18		
2	19		
1	20		

Activity written by Kelly A. Chaston, Davidson College, Davidson, N.C.

2. Recalling Rules: Underline the correct answer.

(A) A perfectly competitive firm would produce the output at which price is equal to $(AC / MC / MR)$.

(B) A monopolistic firm would produce the output at which MC is equal to $(AC / P / MR)$.

Part B

First-Degree Price Discrimination

3. Prove to yourself that a market price of \$17 will generate a total consumer surplus of \$6.

Hint: The consumer surplus generated by the consumer willing to pay \$20 is $(20 - 17) \times 1 = 3$.

CS =

4. Assume that the average and marginal costs are constant and equal to 14. If Pat produces the perfectly competitive quantity and charges the perfectly competitive price,

(A) what price will Pat charge for a tattoo? _____

(B) what quantity will Pat supply? _____

(C) what is the amount of consumer surplus generated? _____

CS =

5. Assume that the average and marginal costs are constant and equal to 14. If Pat produces the monopoly quantity and charges the monopoly price,

(A) what price will Pat charge for a tattoo? _____

(B) what quantity will Pat supply? _____

(C) what is the amount of consumer surplus generated? _____

CS =

6. Again, assume that the average and marginal costs are constant and equal to 14. Now assume that Pat knows the tastes and preferences of all consumers and that the conditions that allow price discrimination apply.

(A) What quantity will Pat supply? _____

(B) At what prices will she sell tattoos?

_____, _____, _____, \$17, _____, _____, _____

(C) What is the amount of consumer surplus generated? _____

CS =

7. Without calculating profit, explain how Pat's profits differ among cases 4, 5 and 6.

Part C

The Effects of Price Discrimination

Use the example of Pat's Patriotic Tattoos to make some conclusions about the effects of price discrimination.

8. What happens to consumer surplus if a firm successfully price discriminates?
9. What happens to the firm's profits if it successfully price discriminates?
10. What happens to the quantity supplied by a successful price-discriminating monopoly firm compared with a nonprice-discriminating monopoly firm?
11. How does the quantity supplied by a successful price-discriminating monopoly firm compare with the quantity supplied by firms in a perfectly competitive industry?
12. How does price discrimination affect economic efficiency?

Part D

Real Examples of Price Discrimination

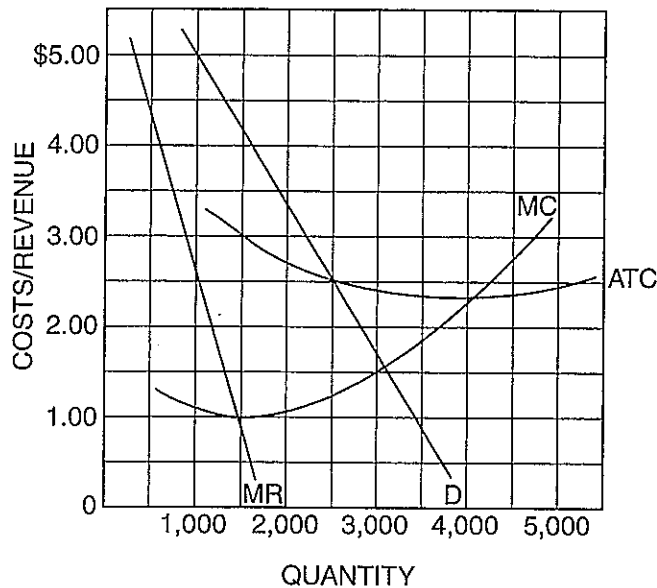
13. Pat's Patriotic Tattoos is a fictional case. What are some real examples of price discrimination?

Regulating Monopoly

Suppose you are an analyst for a board that regulates local monopolies. Your supervisor has given you the three questions below. Using the information in Figure 37.1, answer your supervisor's questions.



Figure 37.1
Regulating a Monopoly



- If this monopolist is not regulated, what will be the level of
 - output? _____
 - price? _____
 - total revenue? _____
 - total costs? _____
 - profit or loss? _____
- If this monopolist is regulated by marginal cost pricing (i.e., the socially optimal price), what will be the level of
 - output? _____
 - price? _____
 - total revenue? _____

Adapted from Robert W. Pulsinelli and Roger LeRoy Miller, *Student Learning Guide to Accompany Economics Today*, 8th ed. (New York: HarperCollins College Publishers, 1994), p. 411.

- (D) total costs? _____
- (E) profit or loss? _____
- (F) Will the monopoly need a subsidy? _____
- (G) If so, how much? _____
3. If cost-of-service regulation (fair-return price or average cost pricing) is imposed on this monopolist, what will be the level of
- (A) output? _____
- (B) price? _____
- (C) total revenue? _____
- (D) total costs? _____
- (E) profit or loss? _____
4. What are the advantages and disadvantages of marginal cost pricing?
5. What are the advantages and disadvantages of cost-of-service regulation?

Monopoly Consultants, Inc.

You have been retained by seven corporations to advise them on their future output and price decisions. These firms are listed on Figure 38.1. Each firm is a pure monopoly and desires to maximize its profits or minimize its losses. Before making your recommendations, fill in as much of the incomplete data in the table as possible. Although you may not be able to fill in every box, there are sufficient data in each case to recommend action that is in the best interest of the firm.

After you have analyzed each case, decide which statement below is the best course of action for the firm involved. Place the number of the statement in the answer column.

1. Nonsense: The information is inconsistent and could not be correct.
2. This firm is in the correct position.
3. This firm should shut down in the short run because its revenue does not exceed variable cost.
4. This firm should shut down in the long run because its revenue does not exceed total cost.
5. This firm should reduce production and increase price.
6. This firm should increase production and reduce price.



Figure 38.1

Monopoly Consultants, Inc. Monopoly Model

Case	Price	Marginal Revenue	Quantity Output	Total Revenue	Total Cost	Fixed Cost	Average Total Cost	Marginal Cost	Answer
1	\$1.25	\$1.00	10,000			\$2,000	\$1.50	\$1.00	
2	5.00	4.00	1,000		\$4,000		minimum level		
3	1.50	2.00	10,000				2.00	2.00	
4	above marginal revenue	5.00					5.00	5.00	
5			4,000	\$8,000	7,200			2.00	
6	7.00	4.00	2,000					3.00	
7			5,000	9,000	10,000	declining	minimum level		

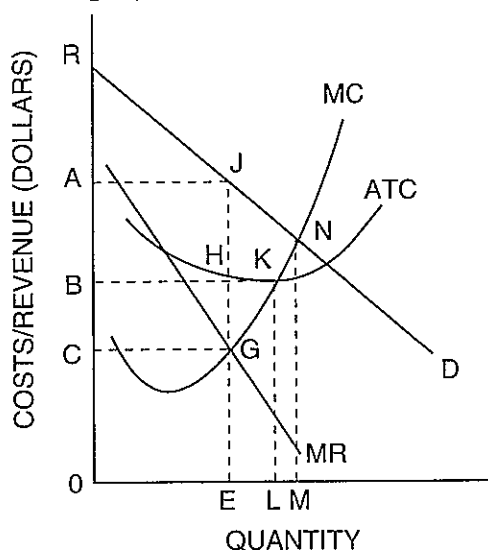
Activity written by Clare E. Adkin, Jr., Cary Academy, Cary, N.C.

A Quick Review of Perfect Competition and Monopoly

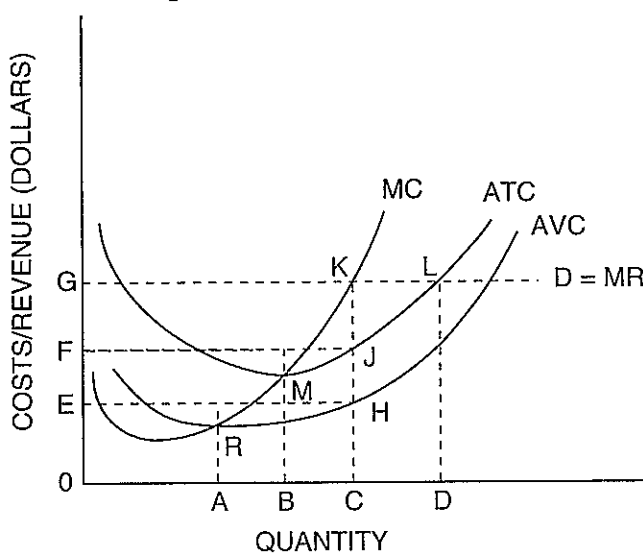


Figure 39.1
Graphs of Monopoly and Perfect Competition

Monopoly



Perfect Competition



These questions are based on Figure 39.1. Underline the correct answer. Assume that the monopoly can set only one price. Both the monopoly and the perfect competitor seek to maximize profits.

1. A monopoly firm will maximize profits at what price?
(A) 0A (B) 0B (C) 0C (D) 0R
2. Economic profits for the monopoly firm are represented by the area of which rectangle?
(A) 0CGE (B) 0AJE (C) AJHB (D) BAJN
3. Total costs for the monopoly firm are represented by the area of which rectangle?
(A) BKLO (B) CGE0 (C) AJE0 (D) BHE0
4. The total revenue for the monopoly firm is represented by the area of which rectangle?
(A) 0CGE (B) 0AJE (C) AJHB (D) BAJH
5. The perfect competitor will maximize profits at what output level?
(A) 0A (B) 0B (C) 0G (D) 0D

The graphs for this activity are from *Test Bank 1 to Accompany Campbell McConnell, Economics*, 10th ed. (New York: McGraw-Hill Book Co., 1987). Activity written by John Morton, National Council on Economic Education, New York, N.Y.

6. The perfect competitor will shut down below which price-output relationship?
(A) K (B) M (C) L (D) R
7. At price 0G, the area of which rectangle represents total revenue for the profit-maximizing perfect competitor?
(A) 0GKC (B) 0FJC (C) FGKJ (D) EFJH
8. At output 0C, total variable cost is represented by the area of which rectangle?
(A) 0GKC (B) FGKJ (C) 0EHC (D) 0FJC
9. At price 0G, profits for the perfect competitor are represented by the area of which rectangle?
(A) 0GKC (B) 0FJC (C) FGKJ (D) 0EHC
10. At what price-output relationship will a perfect competitor operate in the long run?
(A) K (B) L (C) M (D) R
11. For the monopolist, what is the area of consumer surplus?
(A) ABHJ (B) AJGC (C) ARJ (D) ARJE